

DOCUMENT RESUME

ED 196 373

HE 013 379

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TITLE A Reporting and Study Format for University Student Retention Investigations.
PUB DATE 20 Nov 80
NOTE 29p.
EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Academic Persistence; Cohort Analysis; *College Students; Comparative Analysis; Dropouts; *Enrollment Trends; Flow Charts; Graphs; Higher Education; Matrices; *Research Methodology; *School Holding Power; *Statistical Analysis; *Student Attrition; Student Characteristics; Withdrawal (Education)
IDENTIFIERS *Virginia Commonwealth University

ABSTRACT

A reporting and study format for the investigation of university student retention is presented. Student progression and loss is shown graphically and in tabular form to enable ready comprehension and encourage data exploration. Data obtained at Virginia Commonwealth University for 1977-80 are used as illustration. Two ways of viewing student progression are used: the entire group of students of interest each year or semester (snapshot); and particular individuals of interest (cohort). Charts provide information on (1) student flow by headcount and percentage at the university level, class level, and other student classification; and (2) 12 categories of information about student progression. This method shows dynamics (i.e., gain, loss, graduates, and movement between the classifications) as well as overall trends over the study period. Two charts show simplified snapshots for the four undergraduate classes. These charts can bring immediate attention to important issues in areas such as enrollment projections, showing the number of students who leave and enter at the various class levels. The data can also be presented for various subsets of students, including those enrolled in particular schools, and the race and sex groups of interest. A cohort flow for freshmen who applied for admission in 1977 is also included along with a progression matrix allowing simple quantitative comparisons. Basic data elements necessary for such studies, the data analysis methods, and sample forms are included. (SW)

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A Reporting and Study Format
for
University Student Retention Investigations

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November 20, 1980

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
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I. INTRODUCTION

The major objective of this paper is to present an easily comprehensible reporting and study format for the investigation of university student retention. Specifically, to present student progression and loss graphically and succinctly in a tabular form, enabling ready comprehension and encouraging the process of data exploration.

Student progression is defined as the year-to-year academic classification of students by the categories particularly appropriate to each institution. Typically these will include:

- class level (freshmen, etc.)
- full-time, part-time (by credit load)
- new, continuing, transfer, readmit to university
- new, continuing, transfer, readmit to program
- probation
- remedial
- degree awarded
- no longer at university.

The conventional use of the word "retention" is thus a subtopic of progression, and along, it is often of limited interest.

The problem of student progression is conceptually equivalent to one of flow of students from one "state" (combination of the above parameters) to another; the term "transition" thus becomes very useful in denoting the year-to-year change in state.

Descriptors other than the state parameters are essential to the problem. These include race, sex, age, previous academic history, and participation in special programs. Further, there are the "social parameters" of intent, reasons, attitudes, and so on.

The magnitude of the problem requires both delimiting each particular study and, at the same time, enhancing the possibility of identifying meaningful patterns and trends.

Data obtained at Virginia Commonwealth University will be used to explicate the methods of interest. VCU is composed of two campuses, Health Sciences and Academic Studies, including thirteen schools (refer to Appendix A for details), having an enrollment of about 19,000 students.

Appendix B shows the data elements involved in the study, and Appendix C discusses the programming method.

II. OVERALL FLOW

There are two particularly compelling ways to view student progression, namely what will be termed "snapshot" and "cohort". A snapshot is viewing the entire collection of students of interest each year (or semester) throughout the study period. A cohort study is identifying particular individuals of interest and following them throughout the study period.

Charts I and IA show snapshot student headcount flow for VCU in the Fall semesters 1977 through 1980. This is at the university level and provides an orientation for the more detailed charts to follow. Chart II shows the notational conventions used throughout this paper.

VCU has four gross levels of interest: undergraduate, graduate, unclassified (non-degree seeking students, who are not assigned a class level) and professional (students in dentistry and medicine). Charts III and IV show snapshots for Fall 1977-1980. Chart III is headcount, Chart IV shows percentage.

Complex as these may first appear (they can be simplified by omitting the transitions with very small numbers or percentages), they immediately show many important quantitative features of the university that would be obscured in conventional reporting formats. They display trends and variations over the years of the study, as well as "dynamics", i.e., gain, loss, graduates and movement between the various classifications.

Charts V and VI show simplified snapshots for the four undergraduate classes. Note that simplification results in only approximate summations.

Other information can be included on such charts, including explicitly denoting transfer students and the return of stop-outs, but a balance must be struck with clarity.

Charts such as these can bring immediate attention to important issues in areas such as enrollment projections, showing the number of students who leave and enter at the various class levels.

This same data can be presented for various subsets of students, including those enrolled in particular schools, and the race and sex groups of interest. This provides a convenient way of determining whether the progression among the groups is noticeably different.

III. COHORT FLOW

Cohort flow deals with the progress of a collection of specifically identified students. Chart VII shows cohort flow for freshmen who applied for admission to VCU in Fall 1977; specifically, it shows "survival" per 1,000, along with the important subsidiary progression matrix, appearing in the lower left-hand corner.

The progression matrix is a digest of the information on the chart, and along with its brevity, it allows simple quantitative comparisons to be made. Appendix D shows the method for construction of the matrix.

In order to illustrate the usefulness of this method of display, consider Chart VIII, which shows progression of one race/sex subgroup who were freshmen applicants in 1977. Comparison with Chart VII shows that the net retention rate of all the students was about the same as that for the subgroup, but the actual progression of the members of the subgroup was slower. This would not be evident in a more simplistic retention study. This display provokes a number of worthwhile questions, including the need to look closely at the source data for verification of the definitions (there may be differences between the ways in which various departments encode necessary data elements), as well as issues of more immediate pedagogic relevance.

IV. CONCLUSION

A method of display of student progression data has been discussed. It readily shows the progression of particular cohorts as well as overall student flow.

This method views "student retention" as more than merely a count of students who are present, or who have graduated, and allows academic administrators to easily view the complex process that actually does exist.

A series of diagrams, using standard, already prepared forms, is used to show student progression by count and percentage. These are conveniently simplified by showing only those transitions of a significant magnitude. The data is readily available using SAS (or some other high-level language) once the registration files have been made available to the institutional researcher.

Students subsets of interest, defined by such parameters as race, sex, credit hour load, etc., can be followed through the study period and their progress compared.

The cohort percentage charts ("survival charts") are accompanied by brief matrices summarizing year-to-year student progression, thus making data exploration straightforward.

Appendix A

Organization of Virginia Commonwealth University

I. Schools by Campus

Health Sciences Campus

Allied Health
Basic Sciences (1)
Dentistry (2)
Medicine (2)
Nursing (3)
Pharmacy (3)

Academic Campus

Art
Arts and Sciences
Business
Community Services
Education
General Studies (4)
Social Work

Notes

- (1) Graduate programs only
- (2) Classified as "professional schools"; baccalaureate required for admission
- (3) Junior level entry
- (4) Primarily freshmen and sophomores who have not chosen a major

II. Other Significant Aspects

"Special" students are admitted to taking courses for credit in most, but not all, Academic Campus departments. These students are not seeking a degree, and their class level is defined as "special".

A Special Services program exists to aid underprepared students. Students who elect to enter this program can be identified as a subgroup and followed for the purpose of these progression studies.

Appendix B

Necessary Data Elements

1. The basic data elements necessary for such studies are:

Student Demographics

SSN
Race
Sex
Birthdate

Semester Registration Data

Classification (class level)
Credits earned
School in which registered

Graduation Data

SSN
Degree awarded
Date awarded

2. Supplementary data might include.

High School location
High School class size
High School rank
SAT scores
Participation in special studies programs
Transfer information
Credits attempted
Semester GPAs or quality points earned
Status (new, transfer, readmit, etc.)

Appendix C

Method of Data Analysis

SAS (Statistical Analysis System), which operates on IBM 370 series equipment, was used throughout.

Data was moved from OS files, maintained by the Registrar and the Admissions offices, into reformatted files "belonging" to Institutional Research.

For the purposes of these particular studies, a special rectangular file was built having one record for each student present during the Fall 1977 to 1980 semesters. Each record contained:

header: SSN, race, sex, birthdate (month, year)

one record per semester: class level, school, on-campus credits,
degree awarded.

This made it very easy to use subsetting to choose any student group of interest, followed by PROC FREQ. Variables such as race, sex and age group (<20 years old at start of study, 20-24, 25 and over, etc.), are easily accommodated through the use of BY statements.

Output from PROC FREQ is exactly of the form needed to enter data into the standard charts described in the body of this report.

All the SAS programs are written to make it a simple task to add each year's data as it is acquired.

Supplementary information is added using SSN as the identification variable.

Appendix D

The Progression Matrix

In its simplest form, undergraduate student progression can be summarized by listing, over a series of years or academic periods, the "state" in which the students of a cohort are to be found.

Again simply, the state can be defined by stating to which of the following categories the student belongs:

1. registered as freshman, sophomore, junior or senior
2. graduated (received a degree)
3. no longer present (no degree received)
4. present in a special category, such as non-degree seeking (no degree received).

Entries in the table show the number of students in each category for each year, not the number moving into the category. That is, they show population figures, and the three categories S (the special category), Gr (graduates), and L (no longer present) accumulate members, except insofar as stop-outs return.

Once converted into percentages of the initial cohort, retention and attrition rates can be read directly from the matrix. For example, Chart VII of this paper leads to the progression matrix:

	FR	SO	JR	SR	S	Gr	L
1978	13	55	5	2	1	0	24
1979	2	17	35	6	1	1	38
1980	1	5	15	29	2	5	43
1981							

Through 1980, 43% of these students had left VCU without degrees, 5% had received degrees. In 1980, 29% were seniors.

Simple modifications can be made to adapt this progression matrix to the needs of any particular institution.

CHART I

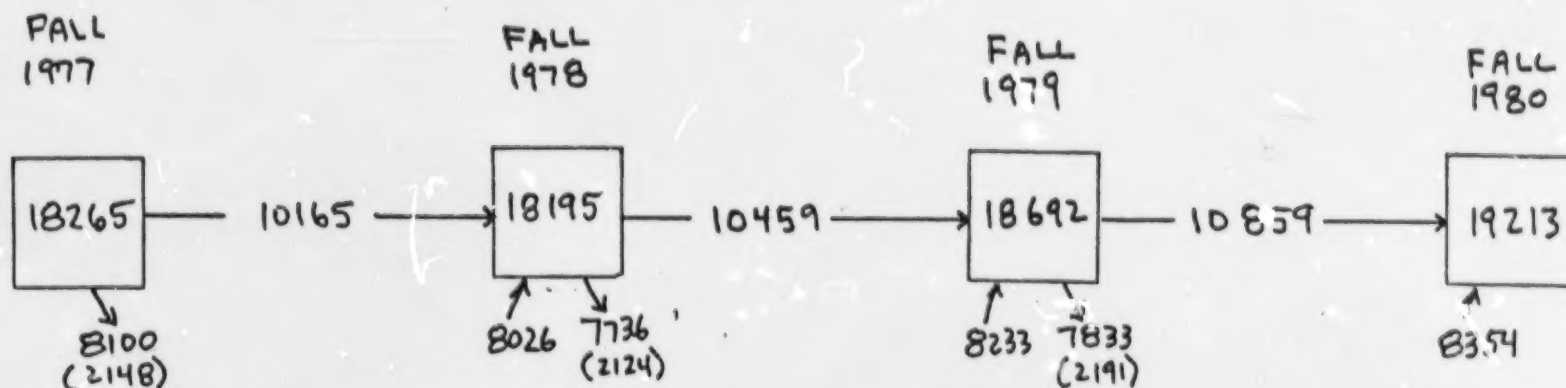
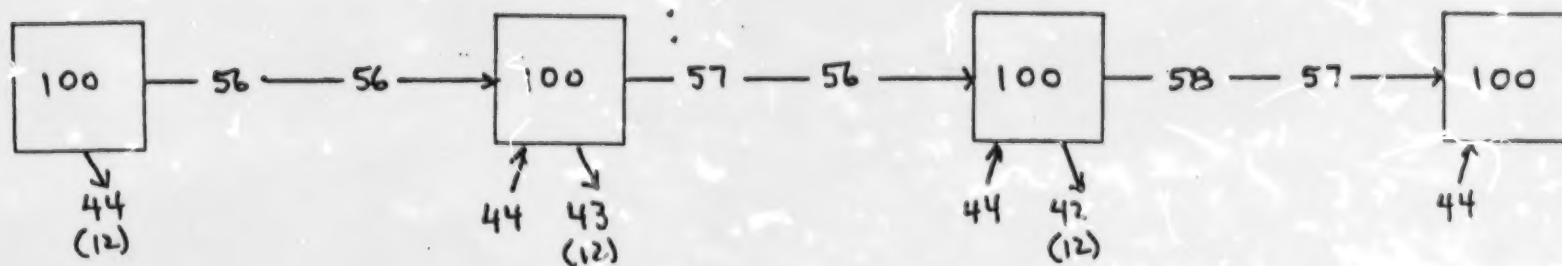


CHART IA



TOTAL ENROLLMENT
ALL LEVELS - ALL STUDENTS

() = degrees

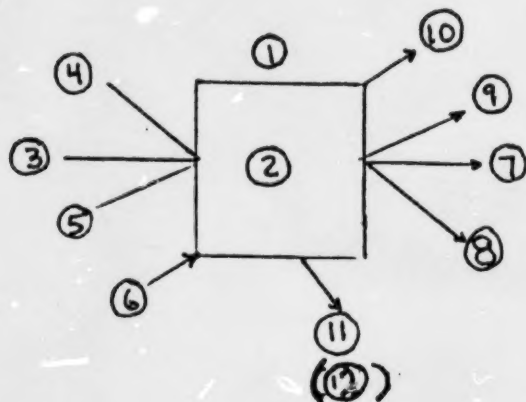
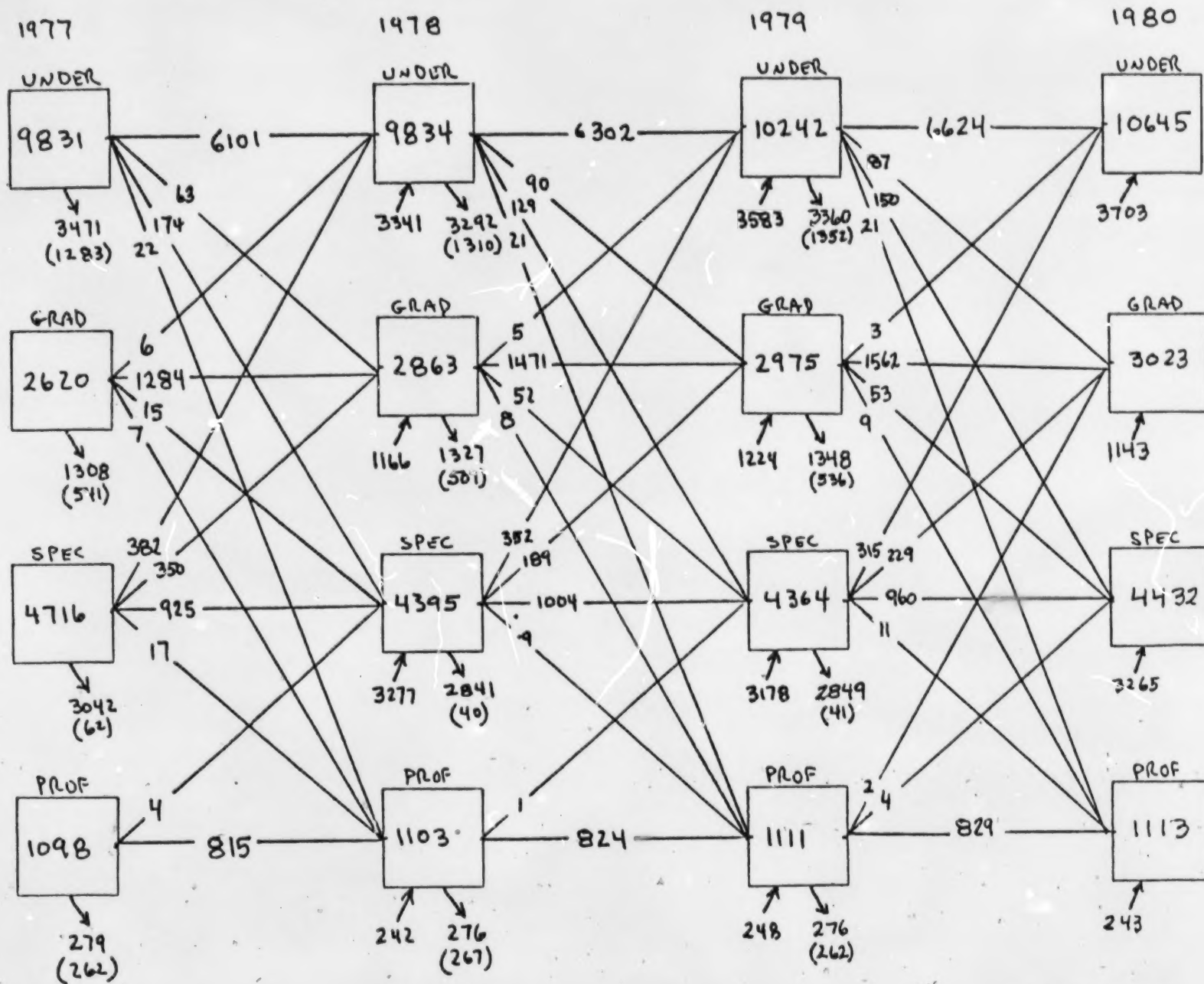


CHART II
NOTATION CONVENTIONS

- ① Class designation
- ② # students in class
- ③ # students entering class, in same class the previous year
- ④ " " " " lower " " "
- ⑤ " " " " higher " " "
- ⑥ " " " " , not present " " "
- ⑦ # students leaving class, entering same class following year
- ⑧ " " " " higher " " "
- ⑨ " " " " lower " " "
- ⑩ " " " " special category " "
- ⑪ " " " " not in attendance " "
- ⑫ " " " " " " " but who received a degree

note: ⑫ is already included in ⑪, broken out for convenience



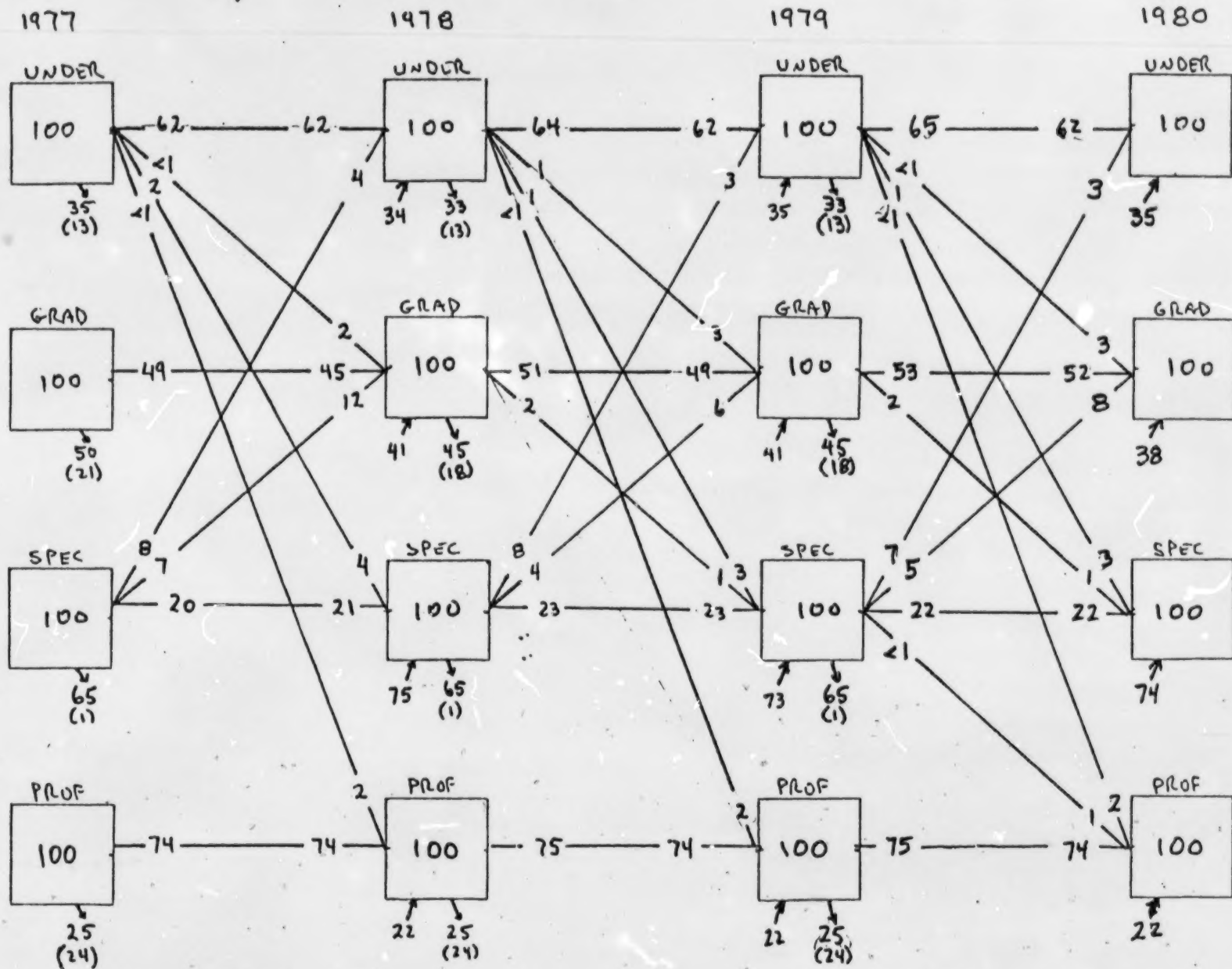
() = degrees

14

ALL STUDENTS

CHART III

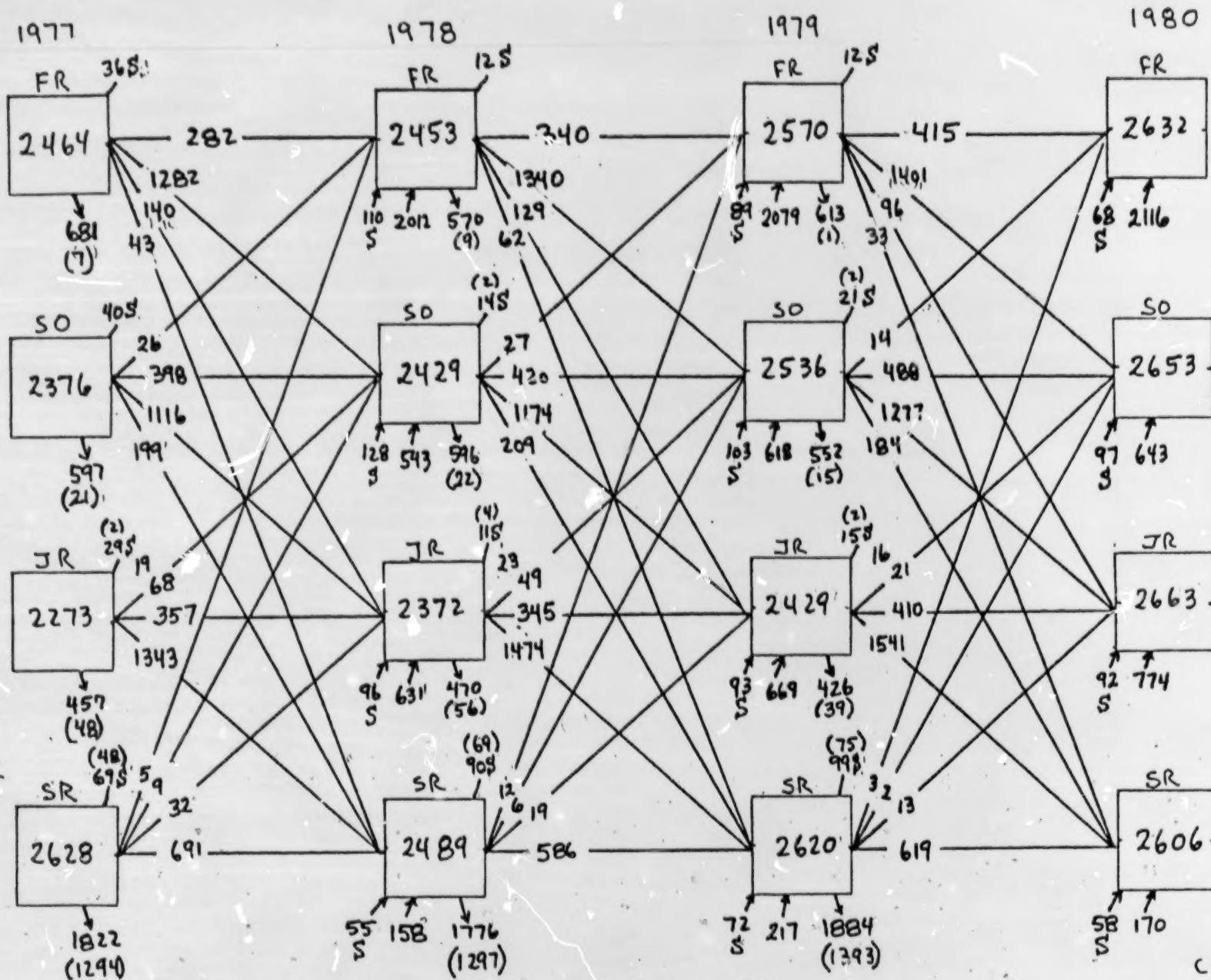
15

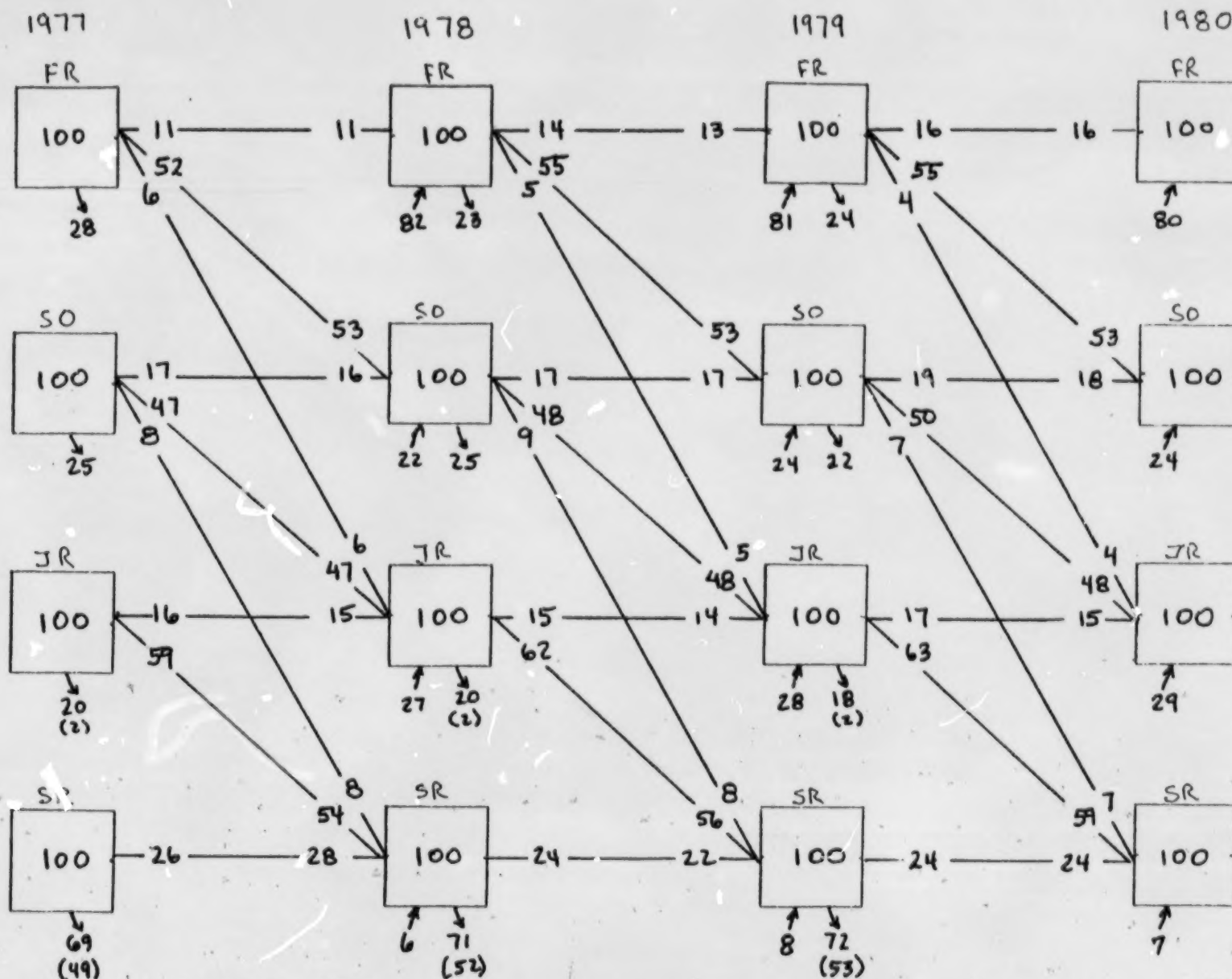


ALL FIGURES ARE
PERCENTAGES
(READ LEFT TO RIGHT)

ALL STUDENTS

CHART IV
() = degrees





ALL FIGURES ARE
PERCENTAGES
(READ LEFT TO RIGHT)

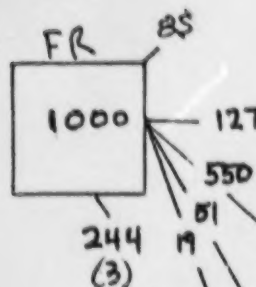
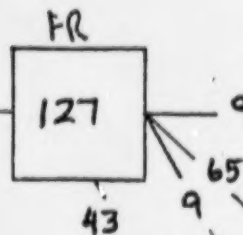
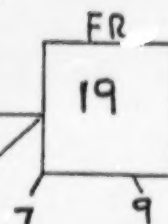
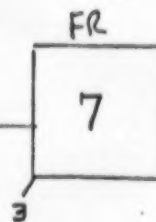
20

ALL STUDENTS

CHART VI

() = degrees

21

FALL
1977FALL
1978FALL
1979FALL
1980

N = 1949

ALL STUDENTS
FRESHMEN WHO APPLIED
FALL 1977

"SURVIVAL"
PER 1000

	FR	SO	JR	SR	S	G	L
78	13	55	5	2	1	0	24
79	2	17	35	6	1	1	38
80	1	5	15	29	2	5	43

() = degrees

22

750
(3)613
(14)532
(47)

CHART VII

23

FALL
1977

FALL
1978

FALL
1979

FALL
1980

FR

FR

FR

FR

1000

220

33

10

164
(3)

76

10

16

3

N = 309

SUBSET OF ALL
FRESHMEN WHO
APPLIED FALL 1977

"SURVIVAL"
PER 1000

	FR	SO	JR	SR	S	G	L
78	22	60	1	0	0	0	17
79	3	28	37	1	0	1	30
80	1	8	19	29	1	1	41

() = degrees

SO

599

76

JR

10

7

SR

3

3
(3)

835
(3)

24

35

10

155

352

3

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SEMESTER
YEAR

FR

FR

FR

FR

FR

Description

SO

SO

SO

SO

SUMMARY MATRX

YR.	FR	SO	JR	SR	S	G	L

JR

JR

JR

JR

SR

SR

SR

SR

() - Degrees



SEMESTER
YEAR

FR

1000

FR

FR

FR

FR

Description

SO

SO

SO

SO

SUMMARY MATRIX

YR.	FR	SO	JR	SR	S	G	L

JR

JR

JR

JR

SR

SR

SR

SR

() — Degrees



STUDENT PROGRESSION
SURVIVAL PER 1000